California Clean Cities Coalitions Alternative Fuels Training Program

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PREPARED BY
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San Diego Miramar College in association with California Clean Cities Coalitions

FOR
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Executive Summary

The California Center for Sustainable Energy researched and prepared a *Needs Assessment for Alternative Fuel Vehicle Training in California*, December 2013. This Needs Assessment was conducted under the same DOE-funded California Fleets and Workplace Alternative Fuels Project that funded the training program which is the subject of this report. The ATTE Center was tasked with providing training in each respective Clean Cities Coalition region. Eleven of the coalitions identified first responder training as their primary need with the remaining two selecting training pertaining to natural gas vehicle technology. As a result of the program 114 total course hours were delivered with attendee training hours equaling 1324. Approximately 82% of the attendees submitted course evaluations. Of those, over 61% found the course an excellent training program, with 37% rating it as a good to excellent training program.

The training provided under this contract focused on primary coalition-identified fleet or first responder training needs. To that end, tailored training programs were delivered in each of the coalition regions. This project has not met all the training needs, however, the Needs Assessment Report and the Training Delivery Program provide a good training foundation and model for addressing additional training needs.

Options for continued training delivery are varied, but all need to include the organizations setting California's policies and regulations, those manufacturing and using alternative-fueled vehicles, alternative-fuel providers, and training providers. Key next steps could include:

1. Appropriate agencies, such as the Clean Cities Coalition and ATTE's, host a statewide forum for advanced transportation technical training. The forum would address training needs/gaps, skill sets required, address the concept of a training network to keep pace with technological changes associated with vehicles/fuels growing in use and/or introduced into the transportation system.

2. Chancellor's Office (ATRE) work with appropriate organizations, including air district and clean cities organizations, to create a training network, possibly patterned after the US DOE sponsored Solar Instructor Training Network.

3. Organizations participating in funding advanced transportation training expand training programs to address not only the alternative fuel components, but also key vehicle and infrastructure systems needed to ensure vehicle and infrastructure operation. For example, electrical, transmission, and brake systems must all be maintained if a vehicle is to be operated at manufacturer specifications thereby ensuring all efficiencies are being attained with the fewest emissions.

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Background and Objectives

In August 2010, the California Community Colleges Chancellor's Office, through its Advanced Transportation Technology and Energy initiative, studied the alternative fuel technical training needs of fleets in California. The findings indicated that there is varying interest in and use of alternative fuels and vehicles across the state. The primary need for technical training was for vehicles using natural gas (both compressed (CNG) and liquefied (LNG)), hybrid systems, and electric vehicles. There is also demand for technical safety training related to vehicles, fueling facilities, and first responders.

Similar to the 2010 study, the California Center for Sustainable Energy (Center for Sustainable Energy) researched and prepared a *Needs Assessment for Alternative Fuel Vehicle Training in California*, December 2013. This Needs Assessment was conducted under the same DOE-funded California Fleets and Workplace Alternative Fuels Project that funded the training program which is the subject of this report. The Needs Assessment identified barriers to the deployment of alternative fuel vehicles (AFV) in California. The assessment reported the following:

- Lack of adequate training of first responders, technicians, and fleet managers in alternative fuel vehicle safety and maintenance.
- AFV safety training needs are different throughout the state. Differences also exist across different regions of the state which have different adoption levels of AFVs.
- While effective alternative fuel safety training curricula exist, it is difficult to match the limited training resources with those that need it most. Although training is available, it is not clear all fleets are having their training needs met.
- Fire chiefs identified two key variables when asked about challenges to training – lack of funding and lack of training time. Despite the fact that 71% of departments indicated more training is needed, little training is planned due to these barriers.
- Across fleet types and sizes the fleet managers report the most important training need is for natural gas fueled vehicles. When asked whether they feel mechanics and first responders should be trained in AFV safety, over 60% of managers feel training for these staff is important or very important.

The Center then worked with the Clean Cities Coalitions throughout California to identify the principal training needs within their region and to identify if the coalitions had a primary technical training partner. The Advanced Transportation Technology and Energy (ATTE) Center at San Diego Miramar College was then tasked to work with each of the coalitions to determine specific training to be delivered and to work with a selected training provider or provide a training provider to deliver the training.

Work Description

The ATTE Center was tasked with providing training in each respective Clean Cities Coalition region, using approved training courses based on the identified needs for additional training for first responders, technicians, and code officials as identified in the Needs Assessment.

Eleven of the coalitions identified first responder training as their primary need with the remaining two selecting training pertaining to natural gas vehicle technology. While some information on hydrogen was included in the training information, the only coalition that expressly asked for the inclusion was the Los Angeles Coalition. Since the training provider, Rio Hondo College, has a partnership with the California Fuel Cell Partnership, the group was able to receive more extensive hydrogen training.

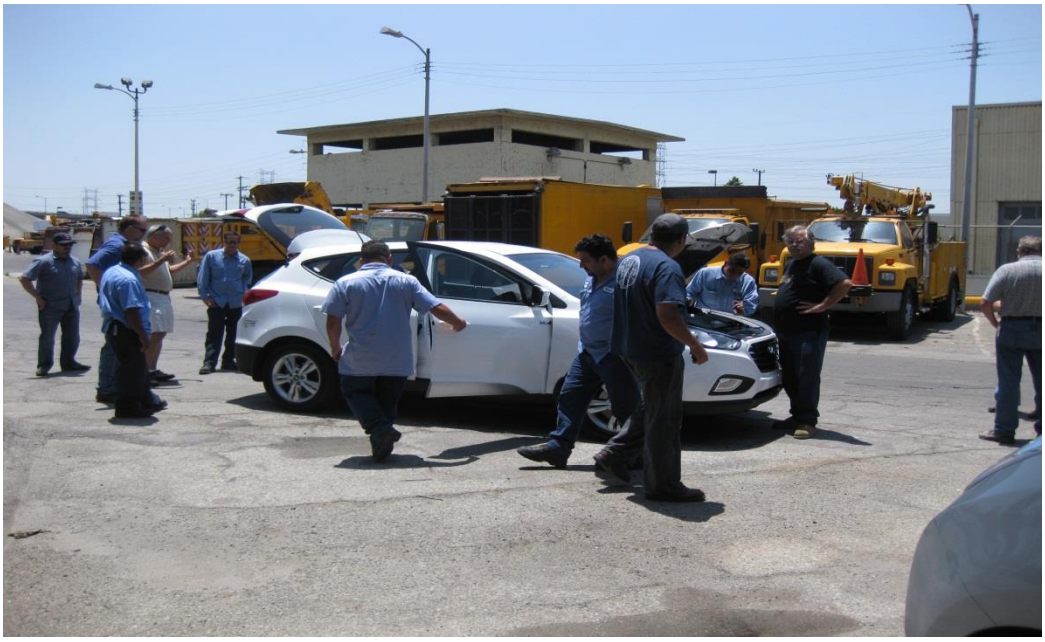

Figure 1 Los Angeles Coalition Training – Hyundai Fuel Cell Vehicle

Technical Training Results

As a result of the program 114 total course hours were delivered with attendee training hours equaling 1324 (hours per course times attendees per course). The following table presents the overall training provided.

COALITION	TYPE OF TRAINING	TRAINER	TRAINING DATE 2014	ATTENDEES
Antelope	First Responder	Rio Hondo College	July 29	16
Central Coast	First Responder	Rio Hondo College	September 5	13
Central Valley	First Responder	Kern CC District	September 27	17
East Bay	First Responder	City College SF	August 13	11
Long Beach	First Responder	Cerritos College	October 9	7
Los Angeles	First Responder	Rio Hondo College	June 11	14
San Diego	First Responder	Rio Hondo College	July 31	7
San Francisco	First Responder	City College SF	August 14	16
Silicon Valley	First Responder	Rio Hondo College	October 3	17
SCAG	First Responder	Rio Hondo College	September 19	12
Western Riverside	First Responder	Rio Hondo College	September 19	5
			Total First Responder Attendees	**135**
Coachella Valley	CNG Cylinder Safety	College of the Desert	June 12-13	11
Sacramento	CNG Technician	Cummins	September 3-5	10
			Total CNG Attendees	**21**
			Total Attendees	**156**

Approximately 82% of the attendees submitted course evaluations. Of those over 61% found the course an excellent training program, with 37% rating it as a good to excellent training program.

Consistently attendees in the first responder courses concluded that the instructor explained everything in detail, with an emphasis on safety issues. The most consistent suggestion for improvement was to increase the "hands-on" portion of the technical labs and to do so by having more equipment (vehicles) available. The emphasis on vehicles was twofold:

1. To be able to see and touch the fueling system, to know where fuel lines are located, and
2. To be able to practice extraction from an alternative fuel vehicle.

Another interesting suggestion was….."isn't there an app for this?" While the hands-on portion cannot be replaced by an "app", this does present an option for a different way to set forth a training refresher along with a frequently asked questions section.

The predominant attendees for the first responder trainings were from local and regional fire departments and the course marketing and materials where well-suited for the participants. The other attendees were not typical first responder personnel. Attendees at the Los Angeles Coalition training included technicians, body shop technicians, training managers, supervisors, and parking enforcement. It appears that a growing interest in "first responder" type safety training is expanding to fleets. In contrast, attendees for the two compressed natural gas (CNG) training courses were principally fleet technicians, including transit; universities, community colleges and school districts; UPS; local government; automotive dealerships; and waste disposal fleet representatives. Based on the course evaluations, there were no course changes

or improvements suggested. All training consisted of two basic components, classroom and lab. The classroom presentation focused on the overall concepts and paralleled the lab information. Manuals on emergency response and/or related materials were presented to all attendees for review and discussion.

Figure 2 Long Beach Coalition Training – El Camino Fire Academy Classroom Setting

Technical training in the "lab" would address various components of alternative fuel vehicles and on the electric vehicle side also addressed infrastructure charging equipment.

Figure 3 Southern California Coalition Training – Charging Infrastructure in Lab Discussion

Problems Encountered and Addressed

Determining the demand for and delivering technical training to fleet technicians and others involved with alternative fuel vehicles continues to be a challenge. Working through the Clean Cities Coalitions was generally an effective way to reach fleet managers and firsts responders, though the effort involves substantial networking to market the training. In reviewing overall training attendance for the natural gas technician courses, there appears to be a closer connection to and higher attendance rates from public fleets as opposed to private fleets. In regards to both types of fleets, training is frequently limited by the demand on technician's time to keep vehicles on the road, requiring the technicians to be in the shop.

In contrast, the time of year is a crucial variable for first responders (i.e. training should occur outside of California's fire season). Even then unforeseen situations and circumstances can pull first responders away from training at a moment's notice. While one of the interesting suggestions for course improvement boiled down to "isn't there an app for this". Continued movement of at least the theoretical portion of these courses to online programs or even "apps" may provide the necessary flexibility for students to access the basic theoretical training more conveniently.

For these trainings, Clean Cities Coalitions were asked to identify a preferred training partner. While they may already have been partnering with a local community college or other training provider, many found that their partner was not able to deliver the desired training. Such circumstances generally occurred based on two circumstances:

1. The training provider did not have sufficient or the appropriate type of equipment to deliver hands-on training.
2. The training provider, while having an overall understanding of alternative fuels did not have specific knowledge in the training area needed.

These circumstances resulted in a focused use of a limited number of trainers who were sufficiently trained to deliver the course. While program delivery was successful (i.e. all thirteen trainings, one in each Clean City Coalition region, were delivered) some delivery dates had to be changed more than once to accommodate trainer schedules. In concert with the demanding and ever-changing schedule of first responders, some courses had lower attendance than desired.

Recommendations

<u>Recommendations for Fleets</u>

There are a number of logistical issues fleet managers' face in acquiring needed technician training. At the point of initial vehicle purchases, particularly if multiple vehicles are purchased,

fleet technicians are likely to receive training from vehicle providers/manufacturers. As these vehicles are under warranty for some period of time and not requiring technician servicing, such training can have variable benefits. As new technicians are hired or retiring technicians replaced, training becomes a higher priority once again. Nonetheless, vehicle maintenance needs tend to require technicians remain onsite, which substantially limits the ability of fleets to allow technicians time for training. In addition, first responders are highly influenced by seasonal climate-related factors. Both they and fleet managers need a wide range of flexibility to address training needs.

Two organizations provide examples for fleet managers to join or emulate: the Southern California Regional Transit Training Consortium, http://www.scrttc.com/, and the California Municipal Equipment Maintenance Association, http://www.memasocal.org/. Both of these organizations work extensively with community college training programs to obtain funding for and the delivery of timely technical training programs. This includes multiple offerings of the same course and even courses that are partially or fully online to provide a high degree of flexibility in delivery.

Recommendations for Training Organizations

From a training perspective, as California continues to increase the use of alternative fuels and alternative fuel vehicles in the transportation sector, a key question is, "How to ensure ongoing technical training readiness to support this movement?" Answering this involves two components:

1. The preparation of new workers who are ready to address such technology as they enter the workforce; and
2. The ongoing skill enhancement of the existing workforce to address such technology change in fleets and the overall consumer market.

To address these from a community college technical training perspective it is clear that a dedicated and integrated statewide/regional approach to building training capacity is needed. Through working with the California Energy Commission and the California Community College Chancellor's Office Advanced Transportation and Renewable Energy (ATRE) program (of which the ATTE Center at San Diego Miramar College is a member) has already identified colleges within selected regions that have the ability to create or expand an education program in transportation alternative fuels or vehicle technology. Through the work of the ATRE, a developing training network includes: American River Community College, Solano Community College, Long Beach City College, Fresno Community College, Cerritos Community College, Rio Hondo Community College, Cypress College, Imperial Valley College, College of the Desert, and San Diego Miramar College, as well as 30 community college partnering campuses.

To achieve such an approach, three primary funding shortfalls need to be addressed:

- Equipment, such as light and heavy duty natural gas engines and/or vehicles, light and medium duty hybrid, plug-in hybrid and electric vehicles and charging systems, electrical

systems training boards, battery testers, engine/transmission/electrical motor cut aways, specialized tools, and diagnostic software programs;

- Faculty professional development, e.g. pursue a faculty professional development certificate program to ensure consistent technical education statewide.
- Curriculum development and availability, including the posting of curriculum on readily accessible websites, such as ATRE.org and 4nrg.org as developed by the Advanced Transportation and Renewable Energy Initiative of the California Community Colleges Chancellor's Office.

Recommendation for Clean Cities Coalitions

The challenge for Clean Cities Coalitions in the area of technical training is that fleets in their respective regions have varying training needs, availability of staff to undertake the training, and limited monies to pay for such training. Coalitions do have the opportunity to bring together fleets and training providers. For example, Coalitions can use meetings and events to highlight training program organizations. They can also assist in the development of regional training plans or even the formation of training partnerships to address key regional needs. While many of the Coalitions foster this type of effort, the administrative or "leg-work" to effectively highlight and address training needs is substantial and will require added assistance from support organizations

Conclusions

The training provided under this contract focused on primary coalition-identified fleet or first responder training needs. To that end successful training programs were delivered in each of the coalition regions. Rather than indicating that via this process all training needs have been met, another way to view the totality of the work is that with both the Needs Assessment report and the Training Delivery program provide an indicator of ongoing technical training needs. There remains an ongoing challenge for first responders and fleet managers to obtain needed training on a timely basis. In addition, alternative fuels technology continues to advance in sophistication, not only for the fuel systems, but also for the entirety of the vehicle operating systems.

Options for continued training delivery are varied, but all need to include the organizations setting California's policies and regulations, those manufacturing and using such vehicles, and training providers. Key next steps could include:

1. Appropriate agencies, such as the Bay Area Air Quality Management District, South Coast Air Quality Management District, California Energy Commission, and Chancellor's Office (ATRE), host a statewide forum for advanced transportation technical training. Such a forum would include key organizations affected by ongoing changes in advanced transportation such as utilities, fuel providers, clean cities coalitions, fleet representatives, and manufacturers. The forum would address advanced transportation training needs/gaps, skill sets required, address the concept of a training network (see

#2) etc. to keep pace with technology changes associated with vehicles/fuels growing in use and/or introduced into the transportation system.

2. Chancellor's Office (ATRE) work with appropriate organizations, including air district and clean cities organizations, to create a training network, possibly patterned after the US DOE sponsored Solar Instructor Training Network.

3. Organizations participating in funding advanced transportation training expand training programs to address not only the alternative fuel components, but also key vehicle and infrastructure systems needed to ensure vehicle and infrastructure operation. For example, electrical, transmission, and brake systems must all be maintained if a vehicle is to be operated at manufacturer specifications thereby ensuring all efficiencies are being attained with the fewest emissions.